

## CHAPTER 4

**WEAPONS SYSTEMS CHECKS  
AND MALFUNCTIONS**

*This chapter discusses boresight procedures, zero procedures, prefire checks, malfunctions, and postfire checks. Crews perform boresighting before zeroing to ensure correct alignment of all weapons systems before firing. Crews perform a prefire check on the turret and all turret weapons systems to ensure operation. A thorough prefire check reduces many of the common malfunctions encountered during firing. If a malfunction occurs, the crew tries to clear it. After firing the weapons systems, the crew makes a postfire check.*

**4-1. BORESIGHT PROCEDURES**

Boresighting aligns the ISU and weapons systems to a common point of aim. Boresighting allows easier and quicker zeroing of the turret weapons systems.

**Note:** Boresight kits must meet the standards of accuracy testing before crews boresight the weapons systems. A kit not meeting the standards is turned into battalion maintenance. Telescopes and adapters that meet the standards are formed into complete kits. Accuracy tests are performed during semiannual services on vehicles or when problems are detected during zeroing. All information about boresight equipment and testing procedures is in Appendix B.

a. There are two methods of boresighting the thermal sight to the daysight—the convenient-target method and the buddy boresight method. The convenient-target method is used during good visibility. The buddy boresight method is used during limited visibility. This procedure can be done only after the 25-mm gun daysight has been boresighted. Both methods are described in detail in TM 9-2350-252-10-2 and TM 9-2350-284-10-2.

b. For restricted or confined areas, like a motor pool, the close-in boresight panel is used to boresight the turret weapons. (See Appendix C for details on the close-in boresight panel.)

c. Crews must boresight the TOW launcher to the TOW reticle (as outlined in the appropriate TMs). Vehicles must have the TOW reticle electronically aligned before the crew boresights the launcher.

d. All turret weapons systems are foresighted before crews fire the Crew Baseline exercise. The weapons are not boresighted again unless the 25-mm receiver is removed, the M240C machine gun is removed, or someone stands on or pulls on the weapons systems from outside of the vehicle.

#### **4-2. ZEROING PROCEDURES**

Zeroing the 25-mm gun allows the gunner to confirm the weapons systems boresight and to make adjustments to the sight reticle in relationship to the impact of the round. Where boresighting brings the ISU line of sight and the weapons systems point of aim together, zeroing allows fine adjustment of that alignment. (Information on zeroing procedures is in TM 9-2350-252-10-2 or TM 9-2350-284-10-2.)

a. After boresighting the 25-mm gun must be zeroed in the manual mode. The gunner and BC observe the strike of the round through their primary sights. The gunner lays the reticle on the target and squeezes the manual trigger switch to fire a round. If the strike of the round is observed within the center of the reticle circle, the 25-mm gun is zeroed. If the round is not centered in the sight reticle circle, the gunner adjusts the boresight control knobs to align the reticle with the round impact. The gunner then re-lays the reticle and fires another round. The procedure is repeated until either the 25-mm gun is zeroed or three rounds have been fired. If three rounds have been fired without zeroing the 25-mm gun, the master gunner checks the system to determine if the problem is mechanical. Once the 25-mm gun has been zeroed to the daysight, the crew leaves the gun aimed at the same point on the target and adjusts the nightsight and auxiliary sight reticles to the daysight point of aim. This does not require firing more zeroing rounds. Crews zero using the most accurate ammunition they have. Superelevation is induced in the ISU when switching between HE and AP ammunition. If problems are noted during firing with superelevation, the crew notifies unit maintenance.

b. Zeroing the coax requires the BC and the gunner to work together. As the gunner fires a short burst of 10 to 15 rounds, he uses his primary sight to observe tracer impact on the target. The BC uses his sight extension to observe the impact. After the BC and the gunner have observed the tracer impact, the BC makes adjustments using the azimuth and elevation knobs to move the impact of the rounds to the reticle aiming point. This sequence is continued until the coax is zeroed. The coax zero target should be placed at a range of 800 meters based on the dispersion, the accuracy, and the ability to observe impact.

c. The crew conducts zeroing procedure during BT VI, Crew Practice 2. The crew then confirms zero during BT VII, Crew Practice 3; and BT VIII, Crew Qualification. Confirmation of zero allows the crew to ensure the vehicle's weapons systems have retained their zero. Normally, confirmation requires only one or two rounds. During confirmation, the crew may need to make some adjustments. If adjustments are needed, the crew uses the same steps used in the zeroing process.

**Note:** After zeroing, M2A2ODS/M3A2ODS crews must ensure that they realign the laser range finder reticle with the gun reticle.

#### 4-3. PREFIRE CHECKLIST

The crew performs prefire checks before conducting live fire. The crew uses a checklist similar to Figure 4-1 and the turret PMCS outlined in TM 9-2350-252-10-2 or TM 9-2350-284-10-2 to reduce vehicle problems on the firing range.

DATE <u>29 NOV 95</u>		PREFIRE CHECKLIST		BUMPER NO. <u>A-66</u>	
GUNNER CHECKS:			INITIALS		
			BC	GNR	
1. Ensure before-operations PMCS has been completed on the hull and turret.			CBMP	RJN	
2. Ensure barrel is LOCKED in (grab barrel and twist, remove muzzle brake plug).			CBMP	RJN	
3. Ensure receiver is LOCKED in, and the breech is properly lubricated.			CBMP	RJN	
4. Ensure bolt and track are lubricated, and that the track hook latch is LOCKED.			CBMP	RJN	
5. Ensure bolt is LOCKED in SEAR.			CBMP	RJN	
6. Ensure manual SAFE is on.			CBMP	RJN	
7. Time and install feeder.			CBMP	RJN	
8. Ensure BPI is LOCKED in SEAR.			CBMP	RJN	
9. Ensure straight drive shaft is LOCKED in.			CBMP	RJN	
10. Ensure power cable is properly attached and SECURELY fastened.			CBMP	RJN	
11. Ensure feeder handle LOCKS in place without resistance.			CBMP	RJN	
12. Ensure AP/HE feed and link eject chutes are secure (front, back, top, and bottom).			CBMP	RJN	
13. Ensure sear retractor is in the OUT position (flush with receiver).			CBMP	RJN	
14. Ensure feed shaft stops are not PROTRUDING or BENT.			CBMP	RJN	
15. Ensure feed select solenoid operates manually.			CBMP	RJN	
16. Manually cycle the M242, 25-mm gun in AP/HE.			CBMP	RJN	

Figure 4-1. Example of a prefire checklist.

DATE <u>29 Nov 95</u>		PREFIRE CHECKLIST		BUMPER NO. <u>A-66</u>	
GUNNER CHECKS:				INITIALS BC GNR	
17. Ensure feed select solenoid operates properly in power mode (select AP/HE SS, LO, HI).				<u>CHP</u>	<u>RJN</u>
18. Power cycle M242, 25-mm gun in AP/HE. Use gunner's, BC's, and manual handwheel trigger. Ensure gun fan activates when triggers are squeezed.				<u>CHP</u>	<u>RJN</u>
19. Manually check elevation, depression, and traverse of turret.				<u>CHP</u>	<u>RJN</u>
20. Elevate/depress gun, traverse turret 360 degrees in normal and fast turret mode.				<u>CHP</u>	<u>RJN</u>
21. Raise and lower the TOW launcher. Ensure launcher elevates and depresses.				<u>CHP</u>	<u>RJN</u>
22. Ensure proper operation of the ISU:				<u>CHP</u>	<u>RJN</u>
a. Clean optics (eyepieces and outside lenses).				<u>CHP</u>	<u>RJN</u>
b. Ensure correct reticle appears when selecting AP, HE, TOW, and 7.62.				<u>CHP</u>	<u>RJN</u>
c. Ensure superelevation changes as range select knob is rotated.				<u>CHP</u>	<u>RJN</u>
d. Ensure the ammunition and range settings are correct.				<u>CHP</u>	<u>RJN</u>
e. Ensure thermal sight can be focused in high magnification.				<u>CHP</u>	<u>RJN</u>
f. Ensure defogger is operating.				<u>CHP</u>	<u>RJN</u>
23. Ensure drift can be nulled out of the system.				<u>CHP</u>	<u>RJN</u>
24. Boresight the M242, M240C, TOW, auxiliary sight, and laser range finder.				<u>CHP</u>	<u>RJN</u>
25. Ensure NBC system operates.				<u>CHP</u>	<u>RJN</u>
26. Ensure 25-mm ready boxes are uploaded with NO MORE THAN TWO ROUNDS ABOVE THE FORWARDER.				<u>CHP</u>	<u>RJN</u>
BC CHECKS:					
1. Ensure coax is CLEAR and barrel is securely LOCKED in the receiver.				<u>CHP</u>	
2. Ensure azimuth and elevation knobs turn freely.				<u>CHP</u>	
3. Install coax and ensure it is LOCKED with the front and rear pins.				<u>CHP</u>	
4. Ensure coax feed chute is fastened at both ends.				<u>CHP</u>	
5. Charge coax. Check the chamber and manually ride the bolt forward.				<u>CHP</u>	
6. Power cycle the coax from the BC's, gunner's, and manual handwheel triggers.				<u>CHP</u>	
7. Charge the coax ready box and place it on SAFE.				<u>CHP</u>	
8. Ensure coax ready box is uploaded.				<u>CHP</u>	
9. Check communications:				<u>CHP</u>	
a. Ensure red, yellow, and green flags are on board.				<u>CHP</u>	
b. Conduct radio checks:				<u>CHP</u>	
(1) Administration net.				<u>CHP</u>	
(2) Firing net.				<u>CHP</u>	
<u>Charles M. Agnew</u> BC SIGNATURE				<u>Richard N. Allen</u> GUNNER	

Figure 4-1. Example of a prefire checklist (continued).

#### 4-4. MALFUNCTIONS

Malfunctions are a major cause of lost firing time on BFV ranges. Crew errors cause most malfunctions. These errors can be easily corrected. BFV crews must know possible reasons a malfunction occurred, so they can take the necessary steps to correct the malfunctions and continue with training.

**Note:** The following steps do not replace misfire procedures. Crews perform misfire procedures then perform the following steps.

a. **25-mm Gun.** If none of the following corrects the malfunction, the crew notifies the master gunner or maintenance personnel.

(1) If the gun did not cycle, the crew checks for the following:

- Is the ARM-SAFE-RESET switch on SAFE?
- Is the LO AMMO OVRD light flashing?
- Is ammunition selected?
- Are the annunciator lights on?
- Is the power cable installed?

(2) If the gun cycled to misfire, the crew checks for the following:

- Is the manual safe on SAFE?
- Is the tension released from the ammunition belt?
- Is the gun out of ammunition?

(3) If the gun cycled but not to sear or misfire, the crew checks for the following and then uses the hand crank to manually cycle the gun back to sear and tries again:

- Is the tension released from the ammunition belt?
- Is the sear retractor out?
- Is the straight drive shaft down?

b. **M240C Machine Gun.** If none of the following corrects the malfunction, the crew notifies the master gunner or maintenance personnel.

(1) If the bolt did not go forward, the crew checks for the following:

- Is the ARM-SAFE-RESET switch on SAFE?
- Is the manual safe on SAFE?
- Is the LO AMMO OVRD light flashing?
- Is coax solenoid plug connected?
- Is ammunition selected?

(2) If the bolt did go forward, the crew checks for the following:

- Is the ammunition belt seated in the feed tray?
- Is there a round or casing stuck in the chamber?
- Is the machine gun out of ammunition?

c. **Turret Drive.** If none of the following corrects the malfunction, the crew notifies the master gunner or maintenance personnel.

(1) If the turret will not traverse, the crew checks for the following:

- Is the turret travel lock locked?
- Is the drive motor in manual?
- Is the turret drive turned on? If so, the crew turns the turret drive off for 30 seconds, then turns it on.

(2) If the gun will not elevate or depress, the crew checks for the following:

- Is the drive motor in manual?
- Is the turret drive turned on? If so, the crew turns the turret drive off for 30 seconds, then turns it on.

d. **Communications.** If communication is lost, the crew checks the following:

- Is the AM-1780 power light on?
- Are the radio cable connections loose?
- Is the CVC cord disconnected?

#### **4-5. POSTFIRE CHECKS**

The crew performs postfire checks after firing. The checks consist of clearing all weapons systems and removing all ammunition residue from the exterior of the vehicle. Leaders verify that crews clear all weapon systems per AR 385-63. (On training ranges, the range safety officers verify that all weapon systems are cleared.) Postfire checks prevent many accidents from occurring.